(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 191 436**
A1

(12) EUROPEAN PATENT APPLICATION

(21) Application number: 86101612.9

(22) Date of filing: 06.02.86

(51) Int. Cl.⁴: B 67 D 1/08, F 25 D 17/02

(30) Priority: 12.02.85 IT 1947785

(43) Date of publication of application: 20.08.86
Bulletin 86/34

(84) Designated Contracting States: AT BE CH DE FR GB LI NL SE

(71) Applicant: SIPP S.p.A., Via Emilia, I-20070 Guardamiglio Milan (IT)

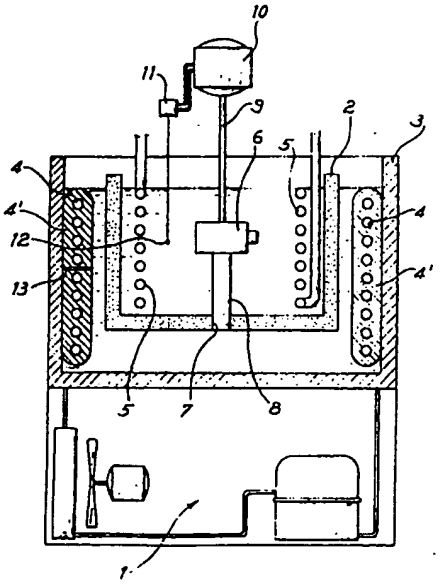
(72) Inventor: Soffientini, Pierluigi, 51, Via Carducci, I-20073 Codogno (Milan) (IT)

(74) Representative: Marietti, Giuseppe, CENTRO DI CONSULENZA IN PROPRIETA' INDUSTRIALE Viale Caldara, 43, I-20122 Milano (IT)

(54) Device for cooling and dispensing drink.

(57) The device is of a type with a first coil being the evaporator coil (4) of a refrigerator system, and at least one other coil (5) through which the drink flows to be cooled; the two coils are immersed in a liquid which constitutes the means of heat transfer, and is characterized by the fact that there are two tanks, (2, 3) contained one within the other; a layer of ice is maintained on the refrigerator coil located in one tank, while the other tank contains the other coil(s) cooling the drink, and by the fact that the two tanks are interconnected by a thermostatically controlled pump (6) which regulates the movement of the liquid between the two tanks, depending on the temperature of the liquid in the tank containing the drink cooling coil(s); the liquid in the tank supplied by the pump is free to overflow into the other bath.

The principal advantage of the refrigeration device according to the invention is the regulation of the temperature of the liquid in heat exchange conditions to cool the drink from a minimum temp of 0 C to higher temperatures with minimum cost and inconvenience.



EP 0 191 436 A1

The present patent refers to an apparatus for dispensing drink and concerns a device to cool drink while the latter is being dispensed.

Machines for dispensing alcoholic and non-alcoholic drink which also cool the drink while it is being dispensed are well known. A commonly used technique for non-alcoholic drink dispensers is to mix a syrup with water directly from the mains supply. The mixing of the syrup and water may take place before or after the refrigeration stage.

The refrigeration devices for the drink or the water to the mixed with the syrup have, up to now, been of two types: ice-layer or water-bath.

The ice-layer refrigeration devices consist of a water tank in which are immersed a primary refrigerator evaporator coil and at least one coil in which the drink to be cooled flows. The refrigerator must be sufficiently powerful to maintain a layer of ice on the evaporator coil; this layer of ice is maintained constant by a sonde which measures the thickness and activates the refrigerator whenever the thickness falls below a set value. A propeller agitator keeps the water in the tank in constant motion; in this way, the water in the tank is kept at the temperature of melting ice. When drink runs through the second coil, the temperature in the bath tends to rise but the instantaneous melting of the ice covering

the evaporator coil returns it immediately to the initial value. Given that the change of state from ice to water requires a large quantity of heat, it is obvious that this device has a high thermal inertia, even with a small water tank and a refrigerator of limited power.

The temperature of the water in the tank being kept constant, the temperature at which the drink leaves the refrigeration device depends on the length of the second coil and the temperature of the drink before refrigeration. Because of the dispensing speed requirement, it is not possible to regulate the temperature of the cooled drink by regulating the flow in the second coil. This constitutes the first drawback of the ice-layer refrigeration device: the dispensing temperature of the drink cannot be regulated and is determined by the temperature of the same before refrigeration. In particular, when the ambient temperature is high, as it is in summer, the dispensing temperature of the drink is higher than when the ambient temperature is low, as it is in winter. A second drawback of the ice-layer device is that the drink undergoes a sharp drop in temperature when it enters the second coil. Such sudden falls in temperature may lead to deterioration of the organoleptic properties of some drinks, especially beer and wine, for which the device is not suitable. To avoid

such drawbacks, a water-bath refrigeration device was proposed, consisting of a tank full of water in which are immersed the evaporator coil of a refrigerator and at least one coil through which the drink circulates to be cooled. Unlike the ice-layer device, there is no ice present in the second device only water kept at a set temperature. In order to permit frequent dispensing of drink at the desired temperature, this device requires a large volume tank and a refrigerator of considerable power to rapidly cool the water in the tank.

To eliminate the above cited drawbacks of the device as known up to now, a device was developed consisting of a combination of the ice-layer and the water-bath devices. Such a device consists of two tanks filled with water, in the first of which is immersed the evaporator coil, covered in a layer of ice, of the refrigerator system while in the second is the coil through which the drink to be cooled circulates. The tanks are interconnected by pipes and a pump circulates the water from the first tank to the second one when the temperature in the second exceeds a set value. This known device has been found to be excessively costly and inconvenient, because of the need for two tanks and three motors; one for the propeller agitator in each tank and one for the water circulation pump. Furthermore, the water-return pipe into

the first tank tends to be obstructed by the inevitable turbidity of the water in the two tanks.

The aim of the present invention is especially to propose a refrigeration device which eliminates the drawbacks of the devices known up to now, allowing, in particular, the treatment of any kind of drink, even those sensitive to changes in temperature, like beer and wine, while presenting limited inconvenience and requiring a refrigerator of limited power.

Another aim of the invention is to propose a device which can regulate the dispensing temperature of the drink, from a minimum of 0 C to higher temperatures.

These aims are achieved by a refrigeration device consisting of an evaporator coil from a refrigerator and at least one coil through which the drink to be cooled flows, the coils being immersed in a liquid which constitutes the means of heat transfer, characterized by the fact that it consists of two tanks, contained one within the other, one of which contains the evaporator coil with constantly maintained ice-layer, while the other contains the drink cooling coil(s); and by the fact that both tanks are interconnected by a pump regulated by a thermostat which, activated by the temperature of the liquid in the tank containing the drink cooling coil(s), causes the liquid to circulate between the two tanks, the

liquid in the tank supplied by the pump being free to overflow into the other tank.

The refrigeration device according to the invention allows the temperature of the liquid in which each of the drink cooling coils is immersed, to be regulated from 0 C, obtained by countinous circulation of the liquid between the two tanks, and a higher temperature, obtained by circulating liquid when the temperature of the liquid in the tank containing the drink cooling coil(s) exceeds a predetermined value. In this way the device according to the invention is able to treat any kind of drink in particular, those more sensitive to changes in temperature, like beer and wine; allowing, furthermore, the regulation of the dispensing temperature of the drink itself.

The presence of the ice layer around the evaporator coil provides a large quantity of refrigeration without resort to a high-powered refrigerator or a large volume of liquid in the two tanks.

The disposition of the tanks, one inside the other, as well as permitting a device of the same dimensions as the ice-layer device, simplifies the circulation of the liquid between the two tanks since the return is by simple overflow.

Further advantages of the device according to the

invention will now be described referring to the attached drawing which is a transverse section of an example of a realization of the same device.

With reference to the attached drawing, the device according to the invention consists essentially of an expanding gas refrigerator (1) and a pair of tanks (2) and (3), one within the other.

In more detail, the walls and base of the smaller tank (2) are carefully insulated and positioned in tank (3) so that there is space between the two walls.

The evaporator coil (4) of the refrigerator unit is situated in tank (3) while the smaller tank (2) contains the coil(s) (5) through which the drink to be cooled flows.

The two tanks are filled with water and are interconnected by a pump (6) which transfers water from tank (3) to tank (2).

In the base of tank (2) there is an opening (7) which connects tank (3) to the intake of the pump (6) through the pipe (8). The pump (6) is driven through the shaft (9) by the electric motor (10) controlled by a thermostat (11) which has a sensor (12) immersed in the water in tank (2) in the immediate vicinity of the drink cooling coil(s) (5). The outlet of the pump (6) is so shaped to promote circulation of the liquid in tank (2), ensuring

even distribution of the heat in tank (2).

When water is transferred from tank (3) to tank (2), the excess in the latter is free to overflow into tank (3),.In this way there is continous circulation between the two tanks.

During operation of the device, the evaporator coil (4) is covered by a layer of ice (4') whose thickness is measured by a sonde (13) which activates the refrigerator (1) whenever the thickness is less than a predetermined value. The temperature in the larger tank (3) is therefore 0 C while that in tank (2) can be 0 C or higher; in particular the temperature of the water in tank (2) can be chosen from a wide range of values and maintained by regulating the thermostat (11). In fact, whenever the temperature of the water in tank (2) exceeds the predetermined value, the thermostat activates the pump (6) which transfers water at 0 C from tank (3) to tank (2). The water overflowing from tank (2) into tank (3) raises the temperature of the water in the latter which is immediately returned to 0 C by the melting of some of the ice-layer (4') covering the evaporator coil (4), whose reduction in turn is detected by the sonde (13) which activates the refrigerator (1).

It should be noted that the layer of ice (4') on the evaporator coil (4) constitutes a considerable thermal buffer, allowing the use of a low-powered refrigerator and

a tank (3) of reduced dimensions.

As stated above, the main advantage of the device according to the invention is to allow the regulation of the temperature of the liquid containing the drink cooling coil(s) from values of 0 C to temperature of 10 C and above. This characteristic advantage allows it to treat all kinds of drink in particular, those most sensitive to changes in temperature, like wine and beer.

The disposition of the tanks, one inside the other, gives a number of advantages; in particular, it allows the device to be of similar dimensions to the ice-layer device; the circulation of the water between the two tanks is facilitated and assured by the fact that its return to the tank from which it was taken by the pump is by simple overflow; the agitation of the water in both tanks is assured by the jet of water from the pump in one and by the overflow in the other, with consequent simplification of the mechanism, which consists solely of the pump motor.

CLAIMS

1. Device for cooling and dispensing drink, consisting of an evaporator coil of a refrigerator and one or more coils through which the drink to be cooled flows, the coils being immersed in a liquid which constitutes the means of heat transfer, characterized by the fact that it consists of two tanks contained one within the other, one tank containing the evaporator coil and maintaining a layer of ice covering the same coil, while the other contains the drink cooling coil(s); and by the fact that the tanks are interconnected by a pump controlled by a thermostat which, depending on the temperature of the liquid containing the drink cooling coil(s), activates the pump which transfers liquid from one tank to the other, the excess liquid being free to overflow into the other tank.

2. Device as claimed in Claim 1, wherein the said pump transfers liquid from the tank in which the refrigerator coil is immersed to the tank containing the drink cooling coil(s), from which tank the excess liquid is free to return to the former tank by overflow.

3. Device as claimed in Claim 2, wherein the walls of the two tanks are separeted from each other and are insulated.

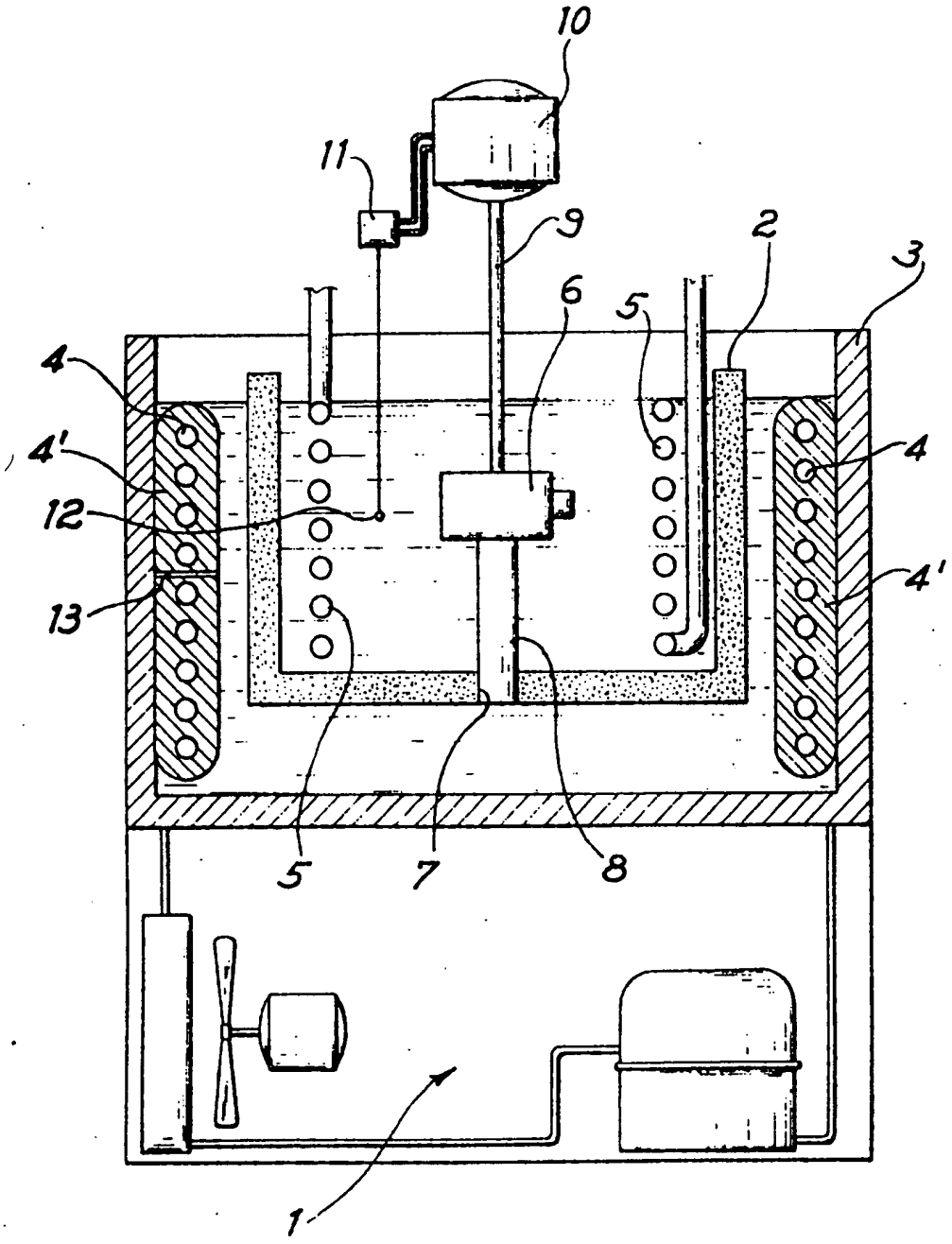
4. Device as claimed in Claim 5, wherein the evaporator coil is situated in the larger tank, while the base of the other tank contains an opening which connects the larger

tank to the intake of the said pump.

5. Device as claimed in Claim 1, wherein the outlet of the said pump is shaped to promote the circulation of the liquid in the smaller tank.

0191436

1/1



European Patent Office

EUROPEAN SEARCH REPORT

0191436
Application number

EP 86 10 1612

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	DE-A-2 349 539 (M.K.) * Pages 8-10; figures 1,2 *	1,2,4	B 67 D 1/08 F 25 D 17/02
Y		3,5	
Y	GB-A-1 346 590 (KOMEDERA) * Page 2, lines 31-110; page 3, lines 19-26 *	3,5	
A	DE-C- 646 207 (BOSCH)		
A	GB-A-2 007 820 (MARSTON PAXMAN)		

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

B 67 D
F 25 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	09-05-1986	VROMMAN L.E.S.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO Form 1503 03 82